

CLAIMS

What is claimed is:

1. A fiber optic security system comprising:
 - a plurality of optical transmitter module for outputting an optical signal;
 - a plurality of optical transmission line for transmitting the optical signal an end of which connected respectively to said optical transmitter modules;
 - a plurality of optical receiver module for detecting the optical signal connected respectively to the opposite end of said optical transmission lines;
 - and a controller for controlling said optical transmitter modules and said optical receiver modules, discriminating the state of said optical transmission lines respectively by a status signal of the optical signal received from said optical receiver modules; wherein,
 - each of the optical transmitter modules comprises a first connector for receiving signals from said controller which can be connected to a transmitting connector of said controller; a second connector which can be connected to the first connector of a neighboring optical transmitter module; and an optical transmitter which outputs an optical signal according to a control signal from said controller;
 - each of the optical receiver modules comprises a first connector for receiving signals from said controller which can be connected to a receiving connector of said controller; a second connector which can be connected to the first connector of a neighboring optical receiver module; and an optical receiver for receiving an optical signal from the optical transmission line;
 - one of said optical transmitter modules is connected to the transmitting connector of said controller and the others are connected one after another, one of said optical receiver modules is connected to the receiving connector of said controller and the others are connected one after another,

said controller provides a data signal and an operation signal to a predetermined optical transmitter module, wherein the data signal is for operating the predetermined optical transmitter module and the operation signal is for operating the optical transmitter of the predetermined optical transmitter module, simultaneously provides the same data signal to an optical receiver module corresponding to the predetermined optical transmitter module and receives a detection signal from the optical receiver module, wherein the same data signal is for controlling the optical receiver module and the detection signal include an information whether the optical receiver module received optical signal from the predetermined optical transmitter module,

each of said optical transmitter modules and said optical receiver modules respectively transmits the data signal received from said controller to neighboring optical transmitter module and neighboring optical receiver module in sequence.

2. A fiber optic security system as claimed in claim 1, further comprising an indicator displaying the status of intrusion in case of receiving an alarm signal from said controller and an external terminal for providing the alarm signal to external device.

3. A fiber optic security system as claimed in claim 1, further comprising a pair of feedback connectors connected respectively to the second connector of the last optical transmitter module and the last optical receiver module in order to feed the data signal from said controller back to said controller.

4. A fiber optic security system as claimed in claim 3, further comprising an indicator displaying the status of intrusion on receiving an alarm signal transmitted from said controller in case of not receiving the feedback data

signal and an external terminal for providing the alarm signal to external device.

5. A fiber optic security system as claimed in claim 1, further comprising,

an optical transmitter module case, being a hollow cylinder in shape, holding said optical transmitter modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical transmitter modules;

an optical receiver module case, being a hollow cylinder in shape, holding said optical receiver modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical receiver modules;

a couple of magnetic body respectively forming prescribed magnetic fields outside of said optical transmitter module case and said optical receiver module case; and

a couple of magnetic sensor respectively placed inside of said optical transmitter module case and said optical receiver module case facing said magnetic bodies, detecting change of position of said optical transmitter module case and said optical receiver module case, outputting a signal regarding change of position to said controller.

6. A fiber optic security system as claimed in claim 1, wherein said optical transmission line is selected from the group consisting of a plastic optical fiber, an optical waveguide, and air.

7. A fiber optic security system as claimed in claim 6, wherein said plastic optical fiber is coated with permeation preventer including urethane acrylate in order to prevent external disturbing rays from permeating and protect the surface of said plastic optical fiber.

8. A method for controlling a fiber optic security system comprising a plurality of optical transmitter module for outputting an optical signal, a plurality of optical transmission line for transmitting the optical signal an end of which connected respectively to said optical transmitter modules, a plurality of optical receiver module for detecting the optical signal connected respectively to the opposite end of said optical transmission lines, a pair of feedback connector, a pair of feedback connectors connected respectively to the last optical transmitter module and the last optical receiver module, and a controller for controlling said optical transmitter modules and said optical receiver modules, discriminating the state of said optical transmission lines respectively by a status signal of the optical signal received from said optical receiver modules, wherein each optical transmitter module and optical transmission line and optical receiver module forms channel, comprising the steps of:

checking status of each channel by transmitting data signals and operation signals to each channel and receiving detection signals in said controller;

storing the number of channels if all the channels are normal, otherwise outputting error signal in said controller;

generating randomly a channel-operation-sequence by a program stored in said controller;

operating a channel according to the channel-operation-sequence by transmitting a data signal and an operation signal to the channel in said controller;

verifying the status of security by outputting warning signal if detection signal is not inputted, otherwise operating next channel according to the channel-operation-sequence in said controller;

regenerating randomly a new channel-operation-sequence in case of receiving detection signal from last channel according to the channel-operation-sequence in said controller.

9. A method for controlling a fiber optic security system as claimed in claim 8, further comprising the step of initializing the fiber optic security system in said controller by transmitting data signals to said optical transmitter modules and said optical receiver modules, transmitting operation signals for operating said optical transmitter modules at the same time, receiving detection signals of optical signals from said optical receiver modules, storing the number of channels which transmit detection signals.

10. A fiber optic security system as claimed in claim 2, further comprising,

an optical transmitter module case, being a hollow cylinder in shape, holding said optical transmitter modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical transmitter modules;

an optical receiver module case, being a hollow cylinder in shape, holding said optical receiver modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical receiver modules;

a couple of magnetic body respectively forming prescribed magnetic fields outside of said optical transmitter module case and said optical receiver module case; and

a couple of magnetic sensor respectively placed inside of said optical transmitter module case and said optical receiver module case facing said magnetic bodies, detecting change of position of said optical transmitter module case and said optical receiver module case, outputting a signal regarding change of position to said controller.

11. A fiber optic security system as claimed in claim 3, further

comprising,

an optical transmitter module case, being a hollow cylinder in shape, holding said optical transmitter modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical transmitter modules;

an optical receiver module case, being a hollow cylinder in shape, holding said optical receiver modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical receiver modules;

a couple of magnetic body respectively forming prescribed magnetic fields outside of said optical transmitter module case and said optical receiver module case; and

a couple of magnetic sensor respectively placed inside of said optical transmitter module case and said optical receiver module case facing said magnetic bodies, detecting change of position of said optical transmitter module case and said optical receiver module case, outputting a signal regarding change of position to said controller.

12. A fiber optic security system as claimed in claim 4, further comprising,

an optical transmitter module case, being a hollow cylinder in shape, holding said optical transmitter modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical transmitter modules;

an optical receiver module case, being a hollow cylinder in shape, holding said optical receiver modules inside, having a plurality of through hole for allowing the optical transmission lines connected respectively to the optical receiver modules;

a couple of magnetic body respectively forming prescribed magnetic fields outside of said optical transmitter module case and said optical receiver module case; and

a couple of magnetic sensor respectively placed inside of said optical transmitter module case and said optical receiver module case facing said magnetic bodies, detecting change of position of said optical transmitter module case and said optical receiver module case, outputting a signal regarding change of position to said controller.

13. A fiber optic security system as claimed in claim 2, wherein said optical transmission line is selected from the group consisting of a plastic optical fiber, an optical waveguide, and air.

14. A fiber optic security system as claimed in claim 3, wherein said optical transmission line is selected from the group consisting of a plastic optical fiber, an optical waveguide, and air.

15. A fiber optic security system as claimed in claim 4, wherein said optical transmission line is selected from the group consisting of a plastic optical fiber, an optical waveguide, and air.